

1 **DIRECT TESTIMONY OF**

2 **JOSEPH K. TODD**

3 **ON BEHALF OF**

4 **SOUTH CAROLINA ELECTRIC & GAS COMPANY**

5 **DOCKET NO. 2013-2-E**

6
7 **Q. PLEASE STATE YOUR NAME, BUSINESS ADDRESS AND POSITION**
8 **WITH SOUTH CAROLINA ELECTRIC & GAS COMPANY (“SCE&G”**
9 **OR “COMPANY”).**

10 A. My name is Joseph K. Todd, and my business address is 220 Operation
11 Way, Cayce, South Carolina 29033. I am employed by SCE&G as General
12 Manager, Fossil & Hydro Operations.

13
14 **Q. DESCRIBE YOUR EDUCATIONAL BACKGROUND AND YOUR**
15 **BUSINESS EXPERIENCE.**

16 A. I earned a Bachelor of Science Degree in Civil Engineering from Clemson
17 University in 1980. I began my career with Duke Power that same year working
18 as a structural engineer for several nuclear plants. I started working with SCE&G
19 in 1981 as a Structural Engineer for V.C. Summer Nuclear Station in Jenkinsville,
20 South Carolina. In this capacity, I participated in the startup and initial operation
21 of this facility and continued working at V.C. Summer until 1990. In 1990, I

1 transferred to the Fossil/Hydro division of SCE&G and assumed a project
2 management role for initial work on the Cope project along with a number of other
3 environmental projects. I also served as Assistant Manager of McMeekin Station
4 from 1995 to 1998 before returning to a project management role for several
5 environmental projects including Selective Catalytic Reduction (“SCR”)
6 installations at the Williams and Wateree Stations. Subsequent roles included
7 Business Manager of the Company’s power operations on the Savannah River
8 Site, and Manager of Fossil/Hydro Outage Planning. I assumed the role of
9 General Manager, Fossil & Hydro Operations in February of 2007. In this
10 position, I report to the Vice President of Fossil Hydro Operations.
11

12 **Q. WHAT IS THE PURPOSE OF YOUR TESTIMONY?**

13 A. The purpose of my testimony is to review the operating performance of
14 SCE&G’s Fossil/Hydro units and South Carolina Generating Company’s
15 (“GENCO”) Williams Electric Generating Station (“Williams Station”) during the
16 period January 1, 2012, through December 31, 2012 (“Review Period”).
17

18 **Q. PLEASE GIVE A SHORT DESCRIPTION OF SCE&G’S FOSSIL AND**
19 **HYDRO ELECTRIC FACILITIES.**

20 A. SCE&G operates eight (8) coal-fired fossil fuel units (2,249 Megawatts
21 (“MW”)), one (1) gas fired unit (95 MW), eight (8) combined-cycle gas

1 turbine/steam generator units (gas/oil fired, 1,310 MW), sixteen (16) peaking
2 turbines (352 MW), four (4) hydroelectric generating plants (218 MW), and one
3 Pumped Storage Facility (576 MW). In addition, SCE&G owns an electric
4 generator at a biomass cogeneration facility which produces an output of 85 MW
5 using a mixture of wood products and coal as its fuel source. The total net non-
6 nuclear summer generating capability rating of these facilities is 4,885 MW. The
7 ratings stated in this testimony are updated at least on an annual basis.

8
9 **Q. DOES SCE&G OPERATE ANY RENEWABLE GENERATORS?**

10 A. Yes, in addition to the biomass cogeneration facility described previously,
11 SCE&G also operates a thin laminate solar generation system on ten acres of
12 rooftop at Boeing's North Charleston production facility. At peak capacity, this
13 system generates 2.6 MW (nameplate).

14
15 **Q. PLEASE DESCRIBE GENCO AND ITS RELATIONSHIP TO SCE&G.**

16 A. GENCO was incorporated on October 1, 1984, as a SCANA subsidiary.
17 GENCO owns the Williams Station. GENCO sells to SCE&G the entire capacity
18 and output from the Williams Station under a Unit Power Sales Agreement
19 approved by the Federal Energy Regulatory Commission. Hereafter, when I refer
20 to SCE&G's fossil steam plants, I include Williams Station.

1 **Q. HOW MUCH ELECTRICITY WAS GENERATED BY SCE&G IN THE**
2 **REVIEW PERIOD?**

3 A. In the Review Period, SCE&G generated 25,494,600 megawatt hours
4 (“MWH”) of energy. Of this energy, the coal-fired plants generated
5 approximately 48%, the combined-cycle units generated approximately 28%, the
6 nuclear plant generated approximately 19%, the peaking gas turbines and hydro
7 facilities generated approximately 4%, and the biomass fuel contribution portion
8 of the cogeneration facility and the solar generation facility generated
9 approximately 1%. Exhibit No. ____ (JKT-1) provides a graphic display of how
10 the Company’s generation met our customers’ demand for energy during this
11 Review Period.

12
13 **Q. PLEASE SUMMARIZE THE PERFORMANCE OF THE FOSSIL/HYDRO**
14 **UNITS.**

15 A. SCE&G’s fossil/hydro units operated efficiently and dependably during the
16 Review Period. Moreover, our fossil units received national recognition for their
17 excellent heat rates. These measures will be covered later in my testimony.
18 SCE&G’s fossil units also had an 80.88% availability factor and a 4.01% forced
19 outage rate during the Review Period. During the summer peak period, June 1,
20 2012, through September 30, 2012, SCE&G operated at an availability factor of
21 85.65%.

1 **Q. PLEASE DISCUSS THE SIGNIFICANT PROJECTS UNDERTAKEN**
2 **DURING SCE&G'S MAINTENANCE OUTAGES FOR THE REVIEW**
3 **PERIOD.**

4 A. As part of the Company's maintenance program, SCE&G undertook a
5 number of significant projects during its maintenance outages in this Review
6 Period. A brief description of this work is as follows:

7 ➤ **Canadys Unit 1** completed their outage in early 2012. Major activities completed
8 during the outage were 4160/480 Volt Switchgear replacements, Turbine Valves
9 inspection, Low Pressure Feedwater Heaters replacements and Superheat Outlet
10 Header Tubes replacement.

11 ➤ **Cope Station** came off-line in the fall 2012 for Steam Turbine & Valve
12 inspections, Partial Waterwall Tubes and Reheat Tube Assemblies replacements,
13 Scrubber Vessel Roof & Cone Repairs and Selective Catalytic Reduction Catalyst
14 Regeneration.

15 ➤ **Jasper Station** came off-line in the spring 2012 for Steam Turbine Blades
16 replacement, Turbine Valves inspection and a Combustion Inspection on Jasper
17 Unit 2. Subsequent to this maintenance outage, SCE&G discovered that two (2)
18 types of steam turbine probes replaced during the outage had failed in service.
19 These probes are a part of the safety protection systems on the turbine; and, if the
20 unit was brought off-line for any reason in the future, the unit could not have been
21 restarted without replacing these probes. These long lead time items were ordered

1 under warranty, and a plan was developed to arrange for replacement as soon as
2 practicable. After evaluating anticipated loads, SCE&G decided to perform this
3 work during an off-peak weekend when lower loads were forecasted and other
4 system generation was available. By proceeding in this manner, SCE&G avoided
5 the potential for a much longer unplanned outage if the unit were forced off-line
6 unexpectedly. This planned two (2) day outage began on Saturday, August 18,
7 2012. During the shutdown process, SCE&G observed that the main turbine stop
8 valves were not functioning properly. These stop valves are critical safety features
9 of the steam turbine, and thus SCE&G had to repair these valves immediately
10 upon discovery of the condition. Had SCE&G not made these repairs and
11 continued to operate the unit with the malfunctioning stop valves, this could have
12 resulted in catastrophic destruction of the steam turbine. SCE&G worked with the
13 vendor to expedite these valve parts from Europe and replace them. Because of
14 this additional work, the outage was extended until August 30, 2012.

- 15 ➤ **McMeekin Unit 1** came off-line on March 4, 2012, with a waterwall screen tube
16 leak. While the unit was off-line for the repair, a switchgear breaker fire occurred
17 on March 5, 2012, causing damage to the 4160 Volt switchgear and associated
18 electrical cables and necessitating their replacement. The replacement of the
19 switchgear and the damaged cables prevented McMeekin Unit 1 from returning to
20 service until October 6, 2012. During the outage, SCE&G also took the
21 opportunity to perform additional maintenance work, including, among other

1 things, the High Pressure & Intermediate Pressure Exciter Refurbishment and Air
2 Preheater Hot & Intermediate Baskets Replacement. As a result of the breaker
3 fire, the Occupational Safety and Health Administration (“OSHA”) performed an
4 extensive inspection at McMeekin Station. Upon completion of its investigation,
5 OSHA issued no citations and determined that no violations had occurred.

6 ➤ **McMeekin Unit 2** came off-line in the spring of 2012 for Low Pressure
7 Turbine/Generator inspections, Turbine Valves inspections, Waterwall Tubes &
8 Burner Panels replacements and Superheat & Reheat Outlet Header inspections.
9 The unit was off-line at the time of the McMeekin Unit 1 breaker fire on March 5,
10 2012, and the McMeekin Unit 2 outage was extended in order to coordinate the
11 electrical work necessary to safely return McMeekin Unit 1 to service. McMeekin
12 Unit 2 was returned to service on June 6, 2012.

13 ➤ **Urquhart Unit 3** came off-line in the fall of 2012 for Turbine Valves inspections,
14 Boiler Gas Firing upgrades and Generator High Voltage Bushings replacement.

15 ➤ **Williams Station** completed their outage in early 2012. Major activities
16 completed during outage were partial replacement of Main Steam Line Piping and
17 Non-Destructive Examination Testing of remaining High Energy Piping.

1 **Q. PLEASE DISCUSS ANY SIGNIFICANT FORCED OUTAGES FOR THE**
2 **PERIOD UNDER REVIEW.**

3 A. SCE&G's Fossil/Hydro Operations defines a significant forced outage as
4 any forced outage in excess of seven (7) days. Fossil/Hydro had three (3)
5 significant forced outages during the Review Period.

- 6 • **Wateree Unit 1** came off-line on January 30, 2012, with a superheater
7 header weld leak and was returned to service on March 10, 2012.
- 8 • **Cope Station** came off-line on February 12, 2012, due to an issue with the
9 scrubber hoppers. This unit was returned to service on February 26, 2012.
- 10 • **Urquhart Unit 3** came off-line on May 30, 2012, due to a bolt failure on
11 an air heater bearing support plate. The unit was returned to available
12 status on June 9, 2012.

13
14 **Q. WHAT WAS SCE&G'S FOSSIL SYSTEM FORCED OUTAGE RATE FOR**
15 **THE PERIOD UNDER REVIEW?**

16 A. Fossil/Hydro experienced a system forced outage rate on its fossil units
17 (including combined-cycle units) of 4.01% in the Review Period. The "forced
18 outage rate" is the percentage of the total hours that generating units are forced out
19 of service (for various reasons) compared with the total in service hours plus
20 forced outage hours for a period. SCE&G's system forced outage rate of 4.01%
21 compared favorably to the North American Electric Reliability Council ("NERC")

1 national five year (2007-2011) average for forced outage rates on all units of
2 6.92%.

3
4 **Q. PLEASE DISCUSS THE AVAILABILITY OF SCE&G’S FOSSIL PLANTS**
5 **DURING THE REVIEW PERIOD.**

6 A. SCE&G had an availability factor of its fossil plants (including combined-
7 cycle units) of 80.88% during the Review Period. Availability factor is a measure
8 of the actual hours that the generation units are available (overall readiness to
9 provide electricity) divided by the total hours in the Review Period. Availability is
10 not affected by how the unit is dispatched or by the demand from the system when
11 connected to the grid. However, it is impacted by the planned and unplanned
12 shutdown hours. For comparison purposes, the NERC national five-year (2007-
13 2011) average for availability from all fossil units was 86.27%, and SCE&G’s
14 five-year average for availability from its fossil units during the same time period
15 was 86.16%.

16
17 **Q. PLEASE EXPLAIN “HEAT RATE” AND DESCRIBE THE HEAT RATE**
18 **OF THE FOSSIL UNITS DURING THE REVIEW PERIOD.**

19 A. Heat rate is a way to measure the thermal efficiency of a power plant. It is
20 the number of British Thermal Units (“Btu”) of fuel required to generate one (1)

1 kilowatt-hour (“kWh”) of electricity. Simply put, the lower the heat rate, the more
2 efficient the plant.

3 The coal-fired steam unit average system heat rate for the Review Period
4 was 10,081 Btu/kWh. Cope Station had the best heat rate in our system at 9,364
5 Btu/kWh followed by Williams Station at 9,715 Btu/kWh. For comparison
6 purposes, the *Electric Light & Power* national five year (2007-2011) average for
7 heat rate for all coal-fired units is 10,427 Btu/kWh.

8 In the 2012 Heat Rate Rankings by *Electric Light & Power*, SCE&G was
9 recognized for having two (2) of its six (6) coal-fired plants listed in the Top 20
10 most energy efficient coal-fired plants in the nation during calendar year 2011.
11 Cope Station was ranked 6th and Williams Station ranked 13th. These two (2)
12 plants represent 44% of the SCE&G coal-fired generating capacity.

13
14 **Q. WHAT IMPROVEMENTS HAS THE COMPANY MADE TO REDUCE**
15 **EMISSIONS AT ITS COAL-FIRED PLANTS?**

16 A. Since 2007, the Company has undertaken several environmental related
17 projects aimed at reducing emissions at SCE&G’s coal-fired plants. The bulk of
18 these projects were required by state and federal regulators to reduce emissions of
19 air pollutants such as sulfur dioxide (SO₂) and nitrogen oxides (NO_x) from its coal-
20 fired electric generating units. As previously reported, the Company installed wet
21 scrubbers at Williams and Wateree to reduce emissions of SO₂. An additional

1 SCR was installed at Cope Station to reduce NO_x emissions from this facility.
2 Each of these pollution control devices continues to run well.

3 SCE&G has also invested in a number of other smaller environmental
4 projects and will continue to invest in environmental improvements on its system
5 as required. At present, however, the Company does not have any plans to install
6 additional scrubbers or SCRs on any of its other coal-fired units in its generation
7 fleet.

8
9 **Q. HAS SCE&G RETIRED ANY COAL PLANTS FROM SERVICE?**

10 A. Yes. In its 2012 Integrated Resource Plan, SCE&G announced its plan to
11 retire the 90 MW coal-fired Unit 1 at Canadys Station and to retire the coal
12 handling facilities at Urquhart Station and operate the 95 MW Unit 3 at Urquhart
13 Station exclusively on natural gas by the end of 2012. SCE&G has since followed
14 through with its plan. Unit 1 at Canadys Station has been retired, and Unit 3 at
15 Urquhart Station now operates exclusively on natural gas.

16
17 **Q. DOES THIS CONCLUDE YOUR TESTIMONY?**

18 A. Yes.

2012 Generation Mix

